



Review Article

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WOUND MANAGEMENT BY SUSHRUTA IN A COMPLETE MANNER: A LITERATURE REVIEW

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ABSTRACT

Wound and its management is one of the most important basic principle of surgery. In modern surgery text wound is described in detail but first evidences are available in ancient Indian system of medicine namely Ayurveda as Vrana and Vrana Ropana (wound healing). Most of the acharyas described it in Samhitas but Sushruta described it in a complete manner which is also practically implemented in various types of wound and specially very useful in non-healing wound where modern surgery has some limitations. Hence in this review article wound management by Sushruta is focused and collected in one article which is scattered in various Adhyaya of Sushruta Samhita.

Keywords: wound, Vrana, wound healing

INTRODUCTION

A wound is a break in the integrity of the skin or tissues often, which may be associated with disruption of the structure and function¹.

Sushruta described wound as Vrana is so called by the wise, since it covers (occupies the skin or the area of the body) and also because the Vrana Vastu (scar/cicatrix formed later) does not get disappear even after healing and remains till the body survives. In present day scar or mark is seen remaining only in broad and deep wounds but not in thin and superficial ones but as per Sushruta Vrana Vastu also means skin, muscles, vessels, tendons, bones, joints, Kushtha (organs), Marmas and as per definition these are not destroyed²

Wound healing

Wound healing is complex method to achieve anatomical and functional integrity of disrupted tissue by various components like neutrophils, macrophages, lymphocytes, fibroblasts, collagen.

Phases of wound healing

- Inflammatory phase (Exudative phase)
- Proliferative phase (collagen/fibroblastic phase)
- Remodeling phase (maturation phase)³

Sushruta also described stages of wound healing in detail in Sutra Sthana Adhyaya no 23 as below

1. Shuddha Vrana - clean wound

The wound which is not invaded by the tridoshas, edges of which are bluish in color, which has developed small eruptions

(granulation tissue) which is even, not having pain and exudation is said to be Shuddha Vrana (clean wound)

2. Rohi Vrana-healing wound

The wound which has the color of the pigeon (grey) inside, is devoid of moisture (exudation), has scales (Flakes) of skin adhering firmly is to be considered as healing wound.

3. Rudha Vrana-healed wound

The wound which has healed in its seat (dwelling place/tissue), which has no eruptions, swelling or pain, has the color same as of the skin and which is even (of one level) is to be considered as healed (properly)⁴

Factors affecting wound healing

Infection, Presence of necrotic tissue and foreign body, Poor blood supply, Venous or lymph stasis, Tissue tension, Hematoma, Large defect or poor apposition, Recurrent trauma, x-ray irradiated area, Site of wound e. g. wound over the joints and back has poor healing. Underlying diseases like osteomyelitis and malignancy, Mechanism and type of wound incised /lacerated/ crush/avulsion, Tissue hypoxia locally reduces macrophage and fibroblast activity⁵.

Problems with wound healing

Wound infection is common in devitalized deep difficult wounds, diabetes, immunosuppressant, cytotoxic drugs, anemia, malnutrition, malignancy increases the chances of wound infection.⁶

Sushruta has also described the wounds which are easy to treat and which are difficult to treat in detail as

Sukhsadhya Vrana - easily curable wounds

Wounds of persons who are youth (Vayastha), strong (Drudha), valiant (Pranvat), of strong mind (sattvavata) i.e., will power and self-controlled (atmavata) are easily curable; when all these four qualities are found in one person only, then wound is very easily curable.

In youth, the wound heals quickly because all the tissues are fully grown; In the strong person, the body having stable and well-developed muscles, the sharp instrument even though used in treatment, do not reach (cause damage) the veins, tendons etc.; persons who are valiant do not become exhausted by pain, injury (by instruments) and control over food etc.; persons who are strong of mind (will power) do not suffer from pain caused by even greatly troublesome treatments. Hence in these kinds of persons wounds are easily curable.

In opposite persons who are old, emaciated, not valiant and afraid of life (death) wounds are difficult to cure or heal.

Wounds situated on the buttocks, rectum (anus), genital organs (penis and vagina), forehead, cheeks, lips, back, ears, scrotum, abdomen, shoulders and inside of the mouth heal easily.

Wounds situated into the eyes, teeth, nose, outer canthus of eye, ears, umbilicus, stomach, sutures (Raphae), buttocks, flanks, epigastrium, chest, axillae, breasts and joints; those which have sinus exuding forth, pus, blood and air (gas), which have a foreign body inside are curable with difficulty, so also those which eliminate (pus etc.) from below in the upward direction, those located near the border of the hairs (in the head) near the root of the nails, vital spots and bones of the lower leg i.e. tibia and fibula; even (wound of) fistula in ano which is facing inward, that wound situated on the Raphae and pelvic bone near it (coccyx) are difficult to cure.

Wounds in person suffering from leprosy, poison, consumption, diabetes mellitus and in those who are having wounds already, heal with difficulty.

The wound which engulfs (vitiates and destroys all the tissues) even in a place which is not a vital spot and is devoid of veins, joints, bones etc. is an incurable feature

The wounds which grow steadily involving the dhatus (tissues) one after the other slowly is not possible to be cured. The wounds which have features opposite of the above is said to be easily curable⁷.

The wounds which happen in the first seat (skin) and causing tear in the skin only is easily treatable; while the remaining kinds (residing in other tissues) and bursting by themselves are treatable with difficulty.

Broad, rectangular, round and triangular are the shapes of the wounds which are easy to treat and the others of abnormal shapes are difficult to treat.

All kinds of wounds heal quickly in persons who are disciplined (use only healthy food and behave as directed by the physician) and treated by a good physician: In those who are not disciplined and treated by ignorant physician leads to great abnormality, because of great increase of the doshas⁸

Sushruta also described the symptoms of Dushta Vrana (infected wound), features of exudates, kinds of pains in the wound and color of wound and incurable wounds in detail⁹.

Wound management

In modern surgery it is described as

If it is in the vital area then -

Maintain airway, arrest bleeding if present, start IV fluids, give oxygen if required, look for deeper communicating injuries and fractures

If it is an incised wound then primary suturing is done after thorough cleaning.

If it is a lacerated wound then the wound is excised and primary suturing is done.

If it is a crushed or devitalized wound and there will be edema and tension in the wound so after wound debridement allow the edema to subside for 2-6 days. Then delayed primary suturing is done.

If it is a deep devitalized wound, after wound debridement it is allowed to granulate completely. Later if the wound is small secondary suturing is done. If the wound is large a split skin graft is used to cover the defect.

In a wound with tension, fasciotomy is done so as to prevent the development of compartment syndrome.

Vascular or nerve injuries are dealt with accordingly by suturing. Internal injuries (intracranial by craniotomy, intrathoracic by intercostals tube drainage, intra-abdominal by laparotomy) has to be dealt with accordingly. Fractured bone is also identified and properly dealt with. Antibiotics, fluid and electrolyte balance, blood transfusion, tetanus toxoid or anti tetanus globulin (ATG) injection¹⁰

In Ayurveda Sushruta acharya also described surgical wound management in detail as he advised the removal of the bandage on the third day of surgery for cleaning of the wound and again advised application of bandage in the same way as done earlier.

He advised not to remove the dressing on the second day itself as wound develops hardness, heals after a long time and produces severe pain.

Afterwards considering the condition of doshas, season, strength etc. the wound should be treated with decoctions, applications of pastes, bandaging, suitable food and activities.

Wound should not be made to heal in a hurry when the doshas (vitiated materials etc.) are still inside: if done so, even slight violations (of regimen) produce elevation inside and gives rise to many abnormalities.

Hence the wound which is clean both inside and outside should be made to heal; even after healing the patient should avoid indigestion, physical exercise, copulation etc.; so also joy, anger and fear, till he attains firmness.

The intelligent physician should remove the bandage after three days in Hemant, (dewy), Shishir, (winter) and Vasant (spring) seasons and after two days in Sharad (autumn), Grishma (summer) and Varsha (rainy) seasons.

As Sushruta described it in detail but at the same time he told that in emergency diseases, this procedure need not be followed strictly by the physician and treatments which are urgently required should be done, just as savaging a house which has caught fire.

Sushruta also told that the pain produced by sharp objects subsides by the application of lukewarm ghee boiled with Yashtimadhuka¹¹.

Sushruta also described the 14 patterns of bandaging according to the site of wound¹².

Sushruta has also given the small details like tightening of bandage i.e., it should not be too loose or too tight. He also described about the position of knotting of the bandage that it should be in three places only i.e., above, below and sides of the wound because knotting on the wound gives rise to pain. He explained the procedure of the bandaging and also has been given minute details about the consistency of the drugs used for the local application on the wound during dressings i.e., the paste of drugs applied should be neither very unctuous nor very dry or uneven (irregular) because too much of unctuousness produces exudation, too much of dryness produces tearing and keeping it in irregularity causes friction at the edges the wound.¹³

Sushruta described 3 kinds of knotting of bandage depending upon the site of the wound i.e., tight (Gadha), moderate (Sama) and loose (Shithila). Tight one is that which though firm doesn't cause pain; loose one is that which exhales (allows movement of air from inside) and even (moderate) one is that which is neither tight nor loose. Tight bandaging should be done on the buttocks, pit of the abdomen, axillae, groins, thighs and head. Moderate one should be done on the extremities, face, ears, throat, penis, scrotum, back, flanks, abdomen and chest. Loose bandage should be on the eyes and joints of bones.

Sushruta also described the time of the bandaging according to Tridoshas but at the same time he said that physician should decide by his own intelligence the suitable time of bandaging.

If tight bandaging is done on places indicated for moderate and loose bandaging then the drug inside the wick of paste becomes a waste, there will be swelling and pain. If the bandage is applied loose on places indicated for tight and moderate binding then the medicine inside the wick falls off and there will be damage to the edges of the wound due to friction. If moderate kind of binding is done on places indicated for tight and loose bandaging there will be no effect of bandaging.

When the bandage is an applied in the proper manner, there will be relief of pain, purification of blood and softness of the wound¹⁴. If bandaging is not done, the wound will be troubled especially by foreign body i.e., bite of flies, assault of grass, sticks, cold, wind, sunlight etc. Many kinds of pain and complications develops, the wound becomes vitiated (contaminated) and poultices etc. and get dried.

Sushruta also told that bandaging should not be done in wounds caused by vitiated Pitta and Rakta, Poison; when accompanied with edema, burning sensation, pus formation, red coloration, wounds caused by alkali and fire, when the muscles of the wound is decomposed and falls off.

Wounds of leprosy, burns by fire, diabetic eruptions, rat bite poison, those caused by poisons, suppuration of muscles (gangrene) and severe ulceration of the rectum, should not be bandaged. The intelligent physician should decide by his own wisdom, whether to apply bandage or not¹⁵.

Sushruta also described the procedure of bandaging as thick of drugs should be kept on the wound and a soft pad kept on it. The paste of drugs inside the wick should not be very unctuous or dry; very unctuous paste gives rise to exudation and very dry paste causes abrasion (of the edges) of the wound, that with suitable unctuousness helps healing. If the wick is not placed properly it causes friction of the edges, makes for more flow so the physician should apply the wick of paste in the proper manner, knowing the

nature of the wounds. In wound produced by Pitta or Rakta, the wick should be applied once only and in wounds of Kapha and Vata origin, it may be applied many times. The wound should be squeezed from its bottom and the exudes made to flow from above downward. All kinds of bandaging ending with the tight kind should be applied appropriately. This is the procedure even for joining of damaged lips. Bandaging should be done with discretion of good knowledge, in such a way that the wound will not cause any trouble to the person for getting up, laying down, sleeping, walking, riding on different kinds of animals, wound which are located on the muscles, skin, joints, bone, viscera (Koshtha), veins, ligaments etc. Which are superficial or deep and all those which are uneven (irregular) will not get cured without bandaging¹⁶.

Sushruta also described a special chapter i.e., vranitopasaniya for the care of the wounded person. He told that first of all select a chamber for the wounded person which is free from dirt (Suchi), sunlight (atapa) and heavy breeze (nivata) so that the person will not suffer from physical, mental and traumatic disorders.

Such chamber should be made convenient to sleep comfortably, wide, pleasing, fit to keep the head to the east and also weapons inside (for protection from enemies, animals etc.). He should reside, served by affectionate friends who talk pleasingly. Friends telling stories, will drive away the discomfort (pain) of the wound and by comforting and pleasant conversation assure the person of cure.

He should not sleep during day, by sleeping during day itching in the wound, feeling of heaviness of body, swelling, pain, redness and exudation-all become greatly increased.

He should protect the wound during his activities such as raising, sitting, turning, walking, speaking loudly etc. The wounded person should not indulge in standing, sitting, walking for long period and sleeping during day, though he is strong as it produces pain in the body parts due to aggravation of vata.

He should avoid, even at a distance, seeing, talking and touching the woman with whom he is eligible for sexual activities (copulation). Because of all this the semen gets dislodged (from its normal seat) and flows out; then the person will derive all the bad effects of copulation though he did not have it actually¹⁷.

Sushruta also described about the food which should not be taken by the wounded person as all this food is known as Dosha sanjanana varga (group causing aggravation of Tridosha) and cause increase of pus.

The person habituated to alcohol should avoid the intake of maireya, asava, arista. Sidhu and by- products of sura as alcohol is sour, dry, penetrating, hot in potency and quick acting if consumed destroys the wound (produces great damage) quickly¹⁸

At the same time Sushruta also described about the food which should be taken by the wounded person in detail¹⁹.

Sushruta also advised the fumigation (Dhupana) of the chamber of the wounded person twice a day for ten days without laziness using sarsapa, leaves of arista (nimba) added with ghee and salt.

Sushruta also advised to worn the herbs like Chatra, Atichatra, Langali, Jatila, Brahmacharini, Laksmi, Guha, Atiguha, Vacha, Ativisha, Satvirya, Sahasravirya and Siddharthaka on the head.

Sushruta also told that the wound should be fanned with fan made of hairs (of animals) but it should not be hit, pricked or scratched

while in sleep. So that the nisacharas (night demons) get away from the patient²⁰.

DISCUSSION

Modern classic text described wound definition, stages of wound healing, factors affecting wound healing and wound management also. In ancient era Sushruta acharya also described the definition of wound, stages of wound healing, wounds which are easily curable and difficult to treat also.

In wound management Sushruta acharya described the minute details like relation of age, strength, mind i.e., will power and self-control with wound healing.

Sushruta has been also described the various sites where wounds heals easily or with difficulty. He also explained the procedure of dressing, advantages of dressing, bandaging, types of bandages according to the site, frequency of bandaging according to the seasons and wound discharge. He also described the details of knotting of bandages i.e., it should be above, below and sides of the wound and not to be so tight or loose. But at the same time, he also mentioned the sites where the bandaging should tight, lose or moderate.

Sushruta described a special chapter for the care of wounded person where he has given the details of the chamber for the wounded person and fumigation of the chamber also. He has also described the qualities of serving persons and visitors.

Sushruta also told that wounded person should avoid sleep in day time, sexual activities and alcohol because these can affect the wound healing. At the same time, he described about the food which should be taken by the wounded person in detail. So, in short Sushruta has explained the very minute details regarding wound management in the ancient period which are not seen in the modern classic text.

CONCLUSION

Sushruta has described very minute details regarding wound management which should be helpful to treat various kinds of wounds specially non healing wound and also this Ayurved classic text will helpful for various research in the wound management.

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